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Pollution Free Effortless Bicycle

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Abstract*: Bicycles were introduced in 19th century in Europe. More than 1 billion cycles have been produced worldwide twice as many as the number of automobiles that have been produced. Early bicycles were mankind's main tool to ride instead of walk. In recent years, being light weight, cheap and pollution-free, bicycles become the most popular traffic vehicles. The first bicycle made is propelled by the feet. After that, in the early 1860s, the bicycles design took the new direction by adding a mechanical crank drive with pedal on the front wheel by the Frenchmen. They can be used as exercise machines and traffic vehicles. The characteristics of the transmission systems are the important factors for bicycles. Here the bicycle runs by means of the Electric motor. The electric motor is being controlled by the switches. The rechargeable battery is used to run the motor. Sprockets of different sizes are being used .The power from the electric motor is transmitted to the wheels by means of the chain drive which is connected in the sprockets. This results in no pollution which is very desirable in the present day situation. No fuel is being used. These are claimed to have a lower environmental impact than the conventional automobiles.

Keywords*: Propelled; Mechanical crank drive; Transmission; Sprockets; Environmental impact.

I. INTRODUCTION

Nowadays, bicycles become the most uses transportation in there world. There are about one billion bicycles in the world that is twice as many as the car, the most preferred transportation in the world. The bicycles become the means transportation for many regions such as the capital city of Japan, Tokyo. They prefer to use the bicycle than using the car to avoid the heavy traffic on the road and the busy public transportations. A bicycle can be ride by one or two person at the same time according to the type of the bicycle. The bicycle is invented more than 200 years ago by a Frenchman Baron von Drais in Mannheim, France. He actually created a walking machine that have two inline wheels that makes him easily to get around faster that walking; propelled by his feet against the ground to move the Draisienne also known as bicycle. After more than 200 years, the bicycles have been change a lot. The bicycles are used for recreational, children's toys, adult fitness, military and police applications, courier services and bicycles racing. The bicycles also have been used for the transportation for the students to get to school and the workers to go to workplace. The first bicycle made is propelled by the feet. After that, in the early 1860s, the bicycles design took the new direction by adding a mechanical crank drive with pedal on the front wheel by the Frenchmen.

II. COMPONENTS AND DESCRIPTION

A. Frame

The frame of an electric bike also has to be slightly different. The main part of the frame (the bit that supports your weight) is usually made from lightweight aluminum alloy: the lighter the frame, the lighter the weight of the bike overall, and the further it can travel before you need to recharge the batteries. The spokes on the wheel also have to be stronger than the thin spokes on a traditional bicycle. That's because the electric motor in the hub spins the wheel with a lot of turning force (known as torque) and, if the spokes were ordinary lightweight ones, they could bend or buckle.

B. Sprocket

A sprocket or sprocket-wheel is a profiled wheel with teeth. The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth. Sprockets are used in bicycles, motorcycles, cars, tracked vehicles, and other machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track, tape etc. Perhaps the most common form of sprocket may be found in the bicycle, in which the pedal shaft carries a large sprocket-wheel, which drives a chain, which, in turn, drives a small sprocket on the axle of the rear wheel. Early automobiles were also largely driven by sprocket and chain mechanism, a practice largely copied from bicycle.

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C. Chain Drive

Wheels of a vehicle, particularly bicycles and motorcycles. It is also used in a wide variety of machines besides vehicles. Most often, the power is conveyed by a roller chain, known as the drive chain or transmission chain, passing over a sprocket gear, with the teeth of the gear meshing with the holes in the links of the chain. The gear is turned, and this pulls the chain putting mechanical force into the system. Another type of drive chain is the Morse chain, invented by the Morse Chain Company of Ithaca, New York, United States. This has inverted teeth.

D. Electric Motor

In the theoretical electric bike we considered up above, we had the dynamo/motor driving the back wheel directly, simply by pressing on the tire. Most electric bikes work a different way. They have compact electric motors built into the hub of the back or front wheel (or mounted in the center of the bike and connected to the pedal sprocket). Take a look at the hub of an electric bike and probably you'll see it's much fatter and bulkier than on a normal bike. This electric motor is used to drive the bicycle when need.

E. Handle

Often support a portion of the rider's weight, depending on their riding position, and provide a convenient mounting place for brake levers, shift levers, bells, etc. Handle bars are attached to a bike's stem which in turn attaches to the fork. Handle bar is used to control the direction of the vehicle.

Fig. 1 Handle arrangement

F. Switches

Switches are used to turn on or off the circuit as per the need. When circuit is close, switch is in on position power supply is given to the motor. Similarly when the circuit is open, switch is off power supply is not given to the circuit of motor.

G. Battery

Lead acid cell is the most commonly used type of battery when high value of load current is necessary. In this engine 48V lead acid battery is used.

H. Wheels

A bicycle wheel is a wheel, most commonly a wire wheel, designed for a bicycle. A pair is often called a wheel set, especially in the context of ready built "off the shelf" performance-oriented wheels. It is used to transmit the power to road surface.

I. Rim

The rim is commonly a metal extrusion that is butted into itself to form a hoop, though may also be a structure of carbon fiber composite, and was historically made of wood. Some wheels use both an aerodynamic carbon hoop bonded to an aluminium rim on which to mount conventional bicycle tires. Metallic bicycle rims are now normally made of aluminium alloy, although until the 1980s most bicycle rims - with the exception of those used on racing bicycles - were made of steel and thermoplastic. Rims

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designed for use with rim brakes provide a smooth parallel braking surface, while rims meant for use with disc brakes or hub brakes sometimes lack this surface. The cross-section of a rim can have a wide range of geometry, each optimized for particular performance goals. Aerodynamics, mass and inertia, stiffness, durability, tubeless tire compatibility, brake compatibility, and cost are all considerations. If the part of the cross-section of the rim is hollow where the spokes attached, as in the Sprint rim pictured, it is described as box-section or double-wall to distinguish it from single-wall rims. The double wall can make the rim stiffer. Triple-wall rims have additional reinforcement inside the box-section.

J. Spokes

The rim is connected to the hub by several spokes under tension. Original bicycle wheels used wooden spokes that could be loaded only in compression, modern bicycle wheels almost exclusively use spokes that can only be loaded in tension. One end of each spoke is threaded for a specialized nut, called a nipple, which is used to connect the spoke to the rim and adjust the tension in the spoke. This is normally at the rim end. Double-butted spokes have reduced thickness over the center section and are lighter, more elastic, and more aerodynamic than spokes of uniform thickness. The hub-and-spoke model is most frequently compared to the point-to-point transit model.

III. WORKING PRINCIPLE

The project bicycle works as same as the normal geared cycle, except which it has an extra gear system and motor is attached to it so as to increase the initial torque and the speed of the vehicle when pedalled. The gear wheels are connected to the driving shaft sprocket of the bicycle pedal which can be pedalled manually. This shaft is in turn is connected to another gear shifter through the chain drive thus when the pedal is operated the power is transmitted to the wheel through the two gear shifter and the power from the pedal is most effectively transmitted to the wheel. Most modern electric bicycles employ brushless DC motor, usually flat hub mounted assemblies consisting of permanent magnet rotor and fixed armature coils energised sequentially by a motor controller. This arrangement means that brushes and commutator are not required, leading to potentially higher motor reliability, listing typical technology choices for electric bicycles, also notes that brushed DC motors are sometimes used (they may be of lower cost). At the same time this cycle is operated by the motor also. The motor and battery were connected in series. The cycle is driven by manual force or automatically by motor. The motor control is located in the handle of the driver.

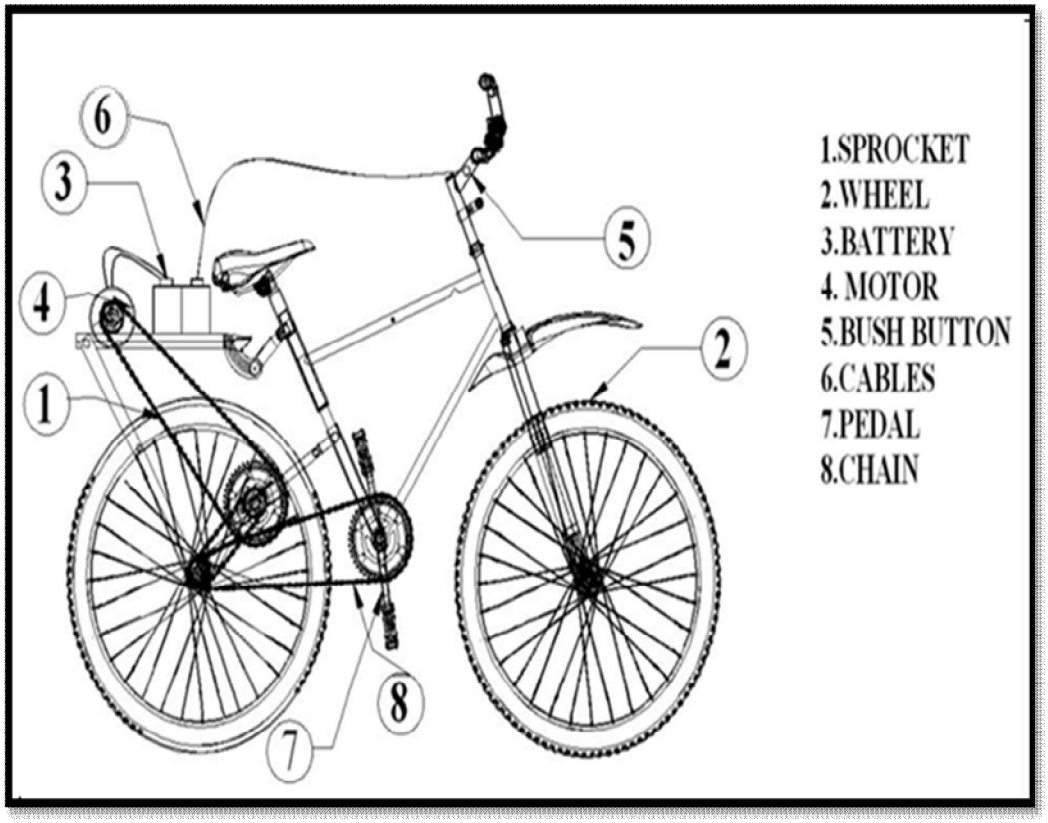

Fig. 2. 2d diagram of effortless bicycle

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IV. CONCLUSIONS

The existing bicycles can be easily modified to work this way. This cycle design is very simple. This cycle is efficient, reliable, safer mode of travelling is achieved. Those who driving this cycle regularly will have good health condition. The bicycle is completely free from pollution, hence it is eco-friendly. During long travel if a driver feels lazy, he can use the motor to drive the cycle smoothly and automatically. The operating and running cost is very low when compared to other modes of transportation. The main disadvantage is not suitable for longer distance.

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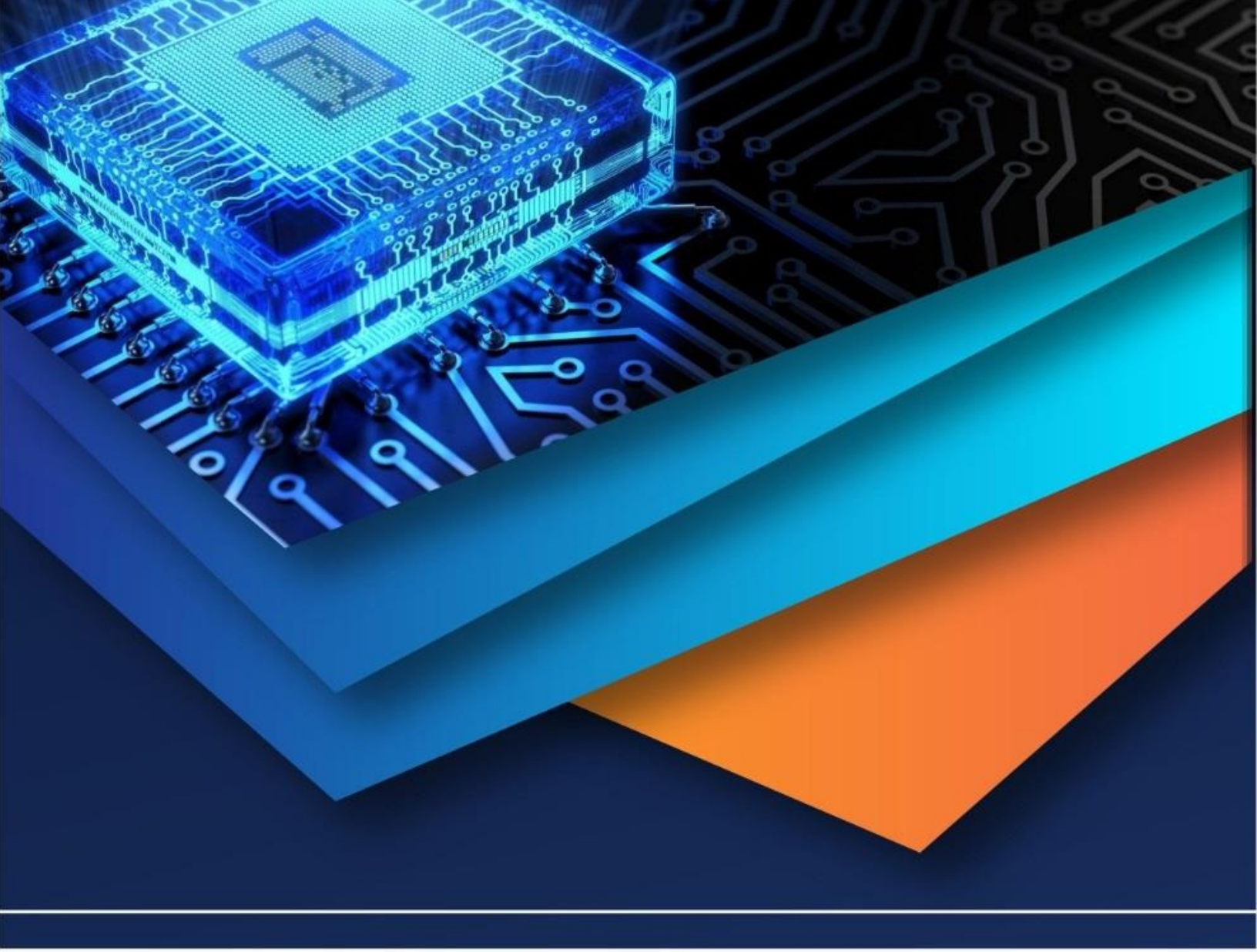

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